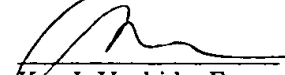—RED WITH THE SPECIFIED MEMBER AND PARAMETERS IN LAYER RULE--.

REMARKS

The above amendments to the specification and the drawings are respectfully

requested for entry into the above referenced patent application.

Respectfully submitted,

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9023, an inquiry is made to the RDB 26 based upon the above specified ~~members~~ member
and the parameters that are specified in the layer rule 42. In the step 9024, the layer
structure definition data is generated as the layer information from the inquiry results
according to the layer rule 42. In the step 9024, by using the generated layer structure

5   definition data, the layer information of the specified member is also stored in the layer
structure information 43, and the above generated layer information is returned to from the
layer structure information management unit 15. The third preferred process then
terminates.

10   As described above, in the third preferred process, the multidimensional database
improves the management efficiency. For example, the layer 4303 as shown in FIGURE
20 is registered at the layer structure information 43 of FIGURE 1 and the retail store
dimension layer rule definition data 3130 as illustrated in FIGURE 15 is registered in the
layer rule 42 of FIGURE 1. When the member 3313 of the third record in the layer rule

15   definition data 3130 is to be stored in the multidimensional database 44 of FIGURE 1, it is
detected that the member 3313 or "PCs" is unregistered. Upon the detection, the layer rule
definition data 3130 is used to generate the layer structure definition data 3213 as shown in
FIGURE 9 for the above unregistered member, and the newly generated layer structure
definition data 3213 is stored at the layer structure information 43. As a result, the

20   merchandise dimensional layer 4302 as shown in FIGURE 20 changes to the retail store
dimensional layer 4313 as shown in FIGURE 10. As described above, the preferred
embodiment according to the current invention generates the layer information for a
specified member by using a member name placed at a specified row in a predetermined
RDB. As illustrated in the example of the merchandise dimension, the member name

25   information is efficiently generated according to a predetermined rule and is stored at the
layer structure information. Since the layer rule determines the layer information
generation, the multidimensional database improves the management efficiency.

A fourth preferred embodiment of the multidimensional database system

30   according to the current invention generates the layer information for an unregistered
member without layer structure information based upon a registered layer rule. For the
lack of the layer structure information 43, the fourth preferred embodiment newly

structure definition data 3201 through 3204 contains a plurality of records that are

separated by lines. Each of the records has members that are separated by commas, and the

separation format is called comma separated value format (CSV). One record potentially

includes all the members from the highest member to the lowest member. The

5 conventional layer structure definition data 3201 through 3203 each is organized to list

records according to the level. That is, in the above example, a record at Level 2 is

followed by a record at Level 1 and then by a record at Level 0. For the layer structure

definition data 3204, a record has only members at Level 0.

10   Now referring to FIGURE 22, a diagram illustrates an example of conventional

data. The data 3301 is stored in the cube and in the above described CSV format. Each of

the record includes members and corresponding cell values. In the example, each record

thus contains five fields respectively for information on month/year, a retail store, a

merchandise name, a number of sales and an amount of sales. The first three fields are

15 respectively from the time dimension, the retail store dimension and the merchandise

dimension. On the other hand, the last two fields are cell values representing the number

of sales and the amount of sales from the unit dimension.

           FIGURE 23 is a diagram illustrating an exemplary display of multidimensional

20 data. The exemplary display is a screen multidimensional data analysis on a terminal

device. The horizontal axis includes members on the time dimension while the vertical

axis includes members on the retail store dimension. All members from the above

dimensions are displayed. On the other hand, as shown in the upper ~~right~~ left corner of the

display, only one member such as television is displayed in the merchandise dimension and

25 only one member such as sales amount is displayed in the unit dimension. The above

exemplary screen display shows the sales amount for televisions at each retail store for

each quarter. For example, the data representing the member 1999Q1 for the time

dimension is a total value of the data 199901, 199902 and 199903. Similarly, the data

representing the member, Eastern Japan for the time dimension is a total value of the data

30 Chiba store and Saitama store. According to the previously noted dimensional layer

structure, the data is a total value. One of the basic functions of the multidimensional

database management system is to search the total value. To obtain more detailed data,

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